BELOW-THE-HOOK LIFTING DEVICES

INTRODUCTION

This chapter outlines the requirements for designing, fabricating, operating, testing, inspecting and documenting of Below-the-Hook lifting devices. It is the intent and purpose of this chapter to provide a means for governing the safety of Fermilab personnel and equipment.

DEFINITIONS

This chapter defines Below-the-Hook lifting devices as equipment (other than slings or rigging accessories) for attaching loads to hoists. These devices are arranged in the following four (4) groups per ASME B30.20.

Group I	Structural and Mechanical Lifting Devices
Group II	Vacuum Lifting Devices
Group III	Magnets, Close Proximity Operated
Group IV	Magnets, Remote Operated

Qualified Person: As defined by ASME B30.20, a qualified person is "a person who, by possession of a recognized degree or certificate of professional standing, or who, by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work."

Additional definitions and terminology are contained in the standards and/or manuals listed below:

ASME B30.20
OSHA 1910 and 1926
DOE Hoisting and Rigging Handbook
Fermilab ES&H Manual

SPECIAL RESPONSIBILITIES

Division/Section Head - The division/section head or their designee shall have the responsibility of carrying out the requirements of this chapter. The division/section head or the designee shall appoint a qualified person(s) for review and maintenance of

the documentation for all Below-the-Hook lifting devices within the division/section control.

ES&H Section - The ES&H Section shall have the responsibility for auditing the Division/Section for compliance with this chapter.

Mechanical Safety Subcommittee - The Mechanical Safety Subcommittee shall serve the Divisions/Sections in a consulting capacity on all Below-the-Hook lifting device matters.

ENGINEERING NOTE PROCEDURE

All Below-the-Hook lifting devices whether purchased or designed and manufactured by Fermilab personnel, and experimenters shall meet these requirements. All purchased lifting devices shall include manufacturer's documentation of compliance to ASME B30.20 and information for the operation and maintenance of the device. Lifting Fixtures provided and used by outside contractors in execution of their contract work are outside the scope of this engineering note procedure.

Design:

1. Engineering Notes: An Engineering Note shall be prepared by a person for all existing and new Below-the-Hook lifting devices owned by Fermilab or collaborating institutions used at Fermilab whether purchased or fabricated at Fermilab or collaborating institution. The minimum format for Engineering Notes is shown in Exhibit A-1 of this chapter. The purpose of Engineering Notes is to allow a reviewer to check the design and to inform future users of the lifting device's limitations.

    a. Engineering Notes for fixtures designed at Fermilab or other non-commercial institutions such as Universities or other Laboratories shall include design compliance calculations to verify that the lifting fixture meets as a minimum the requirements of ASME 30.20, OSHA, and ANSI.

    b. Engineering Notes for fixtures purchased from a commercial source engaged in the manufacturing of lifting fixtures shall include the manufactures Certificate of Test, copies of the Operator's Manual and Inspections and Maintenance Instructions.

    c. Modifications to Below-The-Hook Lifting Devices (whether designed at Fermilab or other non-commercial institutions such as Universities or other Laboratories or purchased from a commercial

source engaged in the manufacturing of lifting fixtures) shall be documented in the Engineering Note.

All Engineering Notes shall include all safety precautions, operating, and maintenance procedures, service or duty cycle rating (if applicable), recommended inspection frequency, and complete nameplate data required for the lifting device.

Where any fixture lifts a load at a point below the center of gravity, the engineering note must explicitly address the issue of the stability of the load and fixture combination.

2. Review of Engineering Notes: All lifting device Engineering Notes shall be reviewed by a qualified person for compliance with the requirements of this chapter.

3. Amendment of Engineering Notes: All subsequent changes in usage that could affect the safety of personnel or the capability of performance of the lifting device shall require an amendment to the original engineering note. This amendment shall be reviewed in the same manner as the original note.

4. Similar Lifting Devices: Lifting devices that are manufactured or fabricated to meet previously engineered, fabricated and reviewed lifting devices need not have the full engineering analysis repeated. Documentation shall be provided by reference to an existing approved Engineering Note and the detailing of all differences. A "Rated Load" test shall be required.

5. Director's Exception: A written exception, signed by the Laboratory Director or his designee, allowing for the use of a lifting device is required for use of a lifting device which does not meet the requirements of this chapter.

    a. The division/section head or their designee shall provide a statement showing the necessity for a Director's Exception.

    b. The engineer or designer shall provide a stress analysis of the lifting device.

    c. The lifting device must be tested per the Testing Section of this chapter.

d. The engineer or designer shall provide a fabrication procedure, a list of planned and/or completed record of inspections and any other quality control procedures used.

e. The engineer or designer shall provide a description of personnel and equipment hazards associated with operation of this lifting device. The hazard analysis shall address the lifting device application, operating limits controls, and inherent safeguards provided.

6. Engineering Note for Existing Lifting Devices: Lifting devices currently in use at Fermilab shall be inspected and reviewed with an Engineering Note prepared. Lifting devices without an Engineering Note shall not be used.

MANUFACTURE

Below-the-Hook lifting devices shall be manufactured to comply with the applicable chapter and group of ASME B30.20:

Identification shall be a part of the manufacturing process. Each device in service at Fermilab shall be labeled with a Fermilab lifting device number and other nameplate data. The manufacturer of purchased devices shall affix its nameplate data and label the device with the Fermilab device number. (All documentation shall reference the Fermilab device number.)

OPERATIONS

All Below-the-Hook lifting devices shall be operated in accordance with the latest edition of ASME B30.20, OSHA and the Fermilab ES&H Manual. Refer to ASME B30.20 for training, operator qualifications, conduct of operations, operating practices, maintenance, and inspection of Below-the-Hook lifting devices.

TESTING

All Below-the-Hook lifting devices are subject to the test requirements of ASME B30.20, the manufacturer, and this chapter. Operational and Load tests shall be performed using hoisting equipment of the proper size and capacity for the device being tested. Operational tests do not require that written records be kept. Rated load tests require testing at 125% of the device's rated capacity. The tests details shall conform to the specific requirements for the device Group within ASME B30.20 and shall be documented in the Engineering Note. This test shall be conducted and a record signed and dated with the signature of the qualified person. Commercially manufactured

lifting devices which have certificates of test or existing devices which have documented evidence of having successfully passed a load test do not need to be re-load tested.

INSPECTIONS

All Below-the-Hook lifting devices shall be inspected in accordance with ASME B30.20, and the manufacturer's recommendations. Inspection frequency shall be determined by the engineer and/or user based on the service. Minimum inspection criteria shall incorporate the items as noted in this chapter and ASME B30.

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Engineering Note Cover Page

Lifting Device Numbers:

FNAL Site No/ _____ Div. Specific No. _____ Asset No. _____

If applicable If applicable If applicable

ASME B30.20 Group: (check one)
- [ ] Group I Structural and Mechanical Lifting Devices
- [ ] Group II Vacuum Lifting Devices
- [ ] Group III Magnets, Close Proximity Operated
- [ ] Group IV Magnets, Remote Operated

Device Name or Description _____

Device was (check all applicable)
- [ ] Purchased from a Commercial Lifting Device Manufacturer. Mfg Name _____
- [ ] Designed and Built at Fermilab
- [ ] Designed by Fermilab and Built by a Vendor. Assy drawing number _____
- [ ] Provided by a User or other Laboratory
- [ ] Other: Describe _____

Engineering Note Prepared by _____ Date _____

Engineering Note Reviewed by _____ Date _____

Lifting Device Data:

Capacity _____

Fixture Weight _____

Service: [ ] normal [ ] heavy [ ] severe (refer to B30.20 for definitions)

Duty Cycle _____ 8, 16 or 24 hour rating (applicable to groups III, and IV)

Inspections Frequency _____

Rated Load Test by FNAL (if applicable) Date _____ Load _____

[ ] Check if Load Test was by Vendor and attach the certificate

Satisfactory Load Test Witnessed by: _____

Signature (of Load Test Witness) _____

Notes or Special Information: